

REMARKS/ARGUMENTS

This case has been carefully reviewed and analyzed in view of the Official Action dated 12 November 2004. Responsive to the objections and rejections made in the Official Action, Claims 1, 9 and 12 have been amended to clarify the combination of elements which form the invention of the subject Patent Application. Additionally, Claims 5, 8, 10, 11, 13, 14, 15 and 16 have been amended to clarify the language thereof.

In the Official Action, the Examiner rejected Claims 13 – 15 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Examiner stated that it was not clear how a circular cross section of an element/pipe can have “sides”. Accordingly, Claim 13 has been amended to remove the reference to sides of the heat-conductive pipe. Instead of the term “side”, the claim now calls for a -- portion -- as contacting other elements. Thus, it is now believed that the claims particularly point out and distinctly claim the subject matter that Applicant regards as the invention.

In the Official Action, the Examiner rejected Claims 1 – 6, 8, 10 – 13 and 16 under 35 U.S.C. § 103, as being unpatentable over Lofland et al., U.S. Patent No. 6,625,021, in view of Lopatinsky et al., U.S. Patent Application Publication 2003/0137047. The Examiner rejected Claims 7 and 15 under 35 U.S.C. § 103, as being unpatentable over Lofland et al. and Lopatinsky et al., and further in view of

Wang, U.S. Patent No. 5,583,746. However, the Examiner kindly indicated that Claim 9 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Further, the Examiner indicated that Claim 14 would be allowable if rewritten to overcome the rejection under 35 U.S.C. § 112, and to include all the limitations of the base claim and any intervening claims.

Claim 9 has been amended to place it in independent form and to include all of the limitations of the base claim, Claim 1, and any intervening claims, which there were none. Thus, Claim 9 should now be allowable.

Before discussing the prior art relied upon by the Examiner, it is believed beneficial to first briefly review the structure of the invention of the subject Patent Application, as now claimed. The invention of the subject Patent Application is directed to a heat-dissipating device. The heat-dissipating device includes a radiator provided with a plurality of longitudinally stacked fins on a heat-conductive base plate. The radiator includes an air-outlet gap disposed between any adjacent two of the fins, and an accommodating opening disposed at an identical location on each of the fins defining a longitudinally extended cavity within the radiator. The heat-dissipating device includes a cross-flow type fan having a plurality of fan blades provided at a shaft plate. The plurality of fan blades are disposed within the cavity of the radiator. The cross-flow type fan generates an air flow by the rotation of the plurality of fan plates where ambient

air is drawn longitudinally into the cavity and transversely discharged radially through the air-outlet gaps to contact the fins. The structure defined in Claim 12 further includes an air inlet disposed at each of opposing longitudinal ends of the cavity, where the ambient air is drawn longitudinally into the cavity through the air inlets and transversely discharged radially through the air outlet gaps to contact the fins.

In contradistinction, the Loftland et al. reference is directed to a heat sink with heat pipes and fan wherein the device includes a radiator having a plurality of stacked fins 40, each having an accommodating opening that define a cavity into which an axial-flow fan 50 is received. As clearly shown in Fig. 6, air on one side of the fan flows toward the fan while air on the other side of the fan flows away from the fan, column 5, lines 61 – 63. Thus, air is drawn in through gaps between the stacked fins on one side of the radiator, and discharged through the gaps between the fins on the opposing side of the radiator. Therefore, the reference clearly teaches away from the invention of the subject Patent Application wherein the cross-flow type fan generates an airflow by the rotation of the plurality of fan blades to draw ambient air longitudinally into the cavity and transversely discharge radially through the air-outlet gaps to contact the fins, as defined in Claim 1. The reference further teaches away from the structure of Claim 12 where the cavity has an air inlet at each of opposing longitudinal ends thereof, the cross-flow type fan generating air flow by the rotation of the plurality of fan blades

where ambient air is drawn longitudinally into the cavity through the air inlets and transversely discharged radially through the air-outlet gaps to contact the fins.

The Lopatinsky et al. reference fails to overcome the deficiencies of Lofland et al. The Lopatinsky et al. reference discloses a cooler for an electronic device wherein the heat exchanging means 8 are formed by flat disks 12 substantially perpendicular to the axis of rotation 9 and thermally connected to the base 7 by at least one heat-spreading means 13 located inside of the drum type impeller 6 and made as guide vanes 14. The heat sink 3 further includes fins 16 located external to the impeller 6 with a plurality of channels 17 disposed therebetween.

Although the impeller 6 is a drum type impeller, the air flow through the heat sink is not unlike that of Lofland et al. As shown in Fig. 11, the air flow flows through the fins 16 at the cross flow blower inlet 18, through the drum type impeller 6 and then flows through the fins 16 at the cross flow blower outlet 19 “in a series way along a plane normal to the axis of rotation 9 of the drum type impeller 6”, page 3, paragraph 42. Thus, here again, the reference teaches away from the invention of the subject Patent Application, creating an air flow with an inlet at one side of the radiator, drawing air in through the gaps between fins, through the fan, and then exiting through further fin portions of the radiator.

Whereas in the invention of the subject Patent Application, the cool ambient air is drawn longitudinally into the cavity within the central portion of the

radiator and then discharged radially through the air outlet gaps between the fins to dissipate the heat therefrom. The invention of the subject Patent Application provides a much more efficient cooling method wherein the cool ambient air is uniformly distributed to all surfaces of the fins, en masse, to provide a uniform heat transfer from the radiator. Whereas, the referenced devices bring the cool ambient air unit to one side of the radiator, wherein it begins the heat transfer with the fins such that the inlet side of the radiator is able to dissipate a greater heat than the outlet side, which receives already warmed air. Thus, the referenced systems do not provide uniform heat dissipation from the radiator.

The structure defined in Claims 8 and 12, wherein a second air inlet is provided, provides further advantages over the prior art in terms of heat dissipation efficiency. In order to discharge a predetermined volume of air radiantly outwardly through the 360 degree air outlet, a sufficient volume of air must be drawn into the cavity of the radiator. Where the radiator would have a single air inlet, the cavity size, as defined by the opening in each fin, must be sufficiently large to accommodate the air volume. Therefore, either the fin surface area must be reduced to accommodate the large opening or the overall fin size increased for the radiator of a predetermined heat dissipation capacity. By providing multiple air inlets, at opposing longitudinal ends of the radiator, a greater air volume can be drawn into the cavity through a respectively smaller accommodating opening, allowing for a larger fin surface area with a smaller

overall fin size.

As neither Lofland et al. nor Lopatinsky et al. disclose or suggest the combination of elements which form the invention of the subject Patent Application, as now claimed, and in fact teach away from the invention of the subject Patent Application, they cannot make obvious that invention.

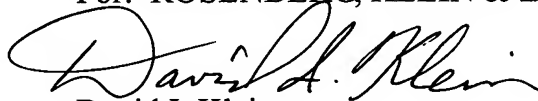
The Wang reference does not overcome the deficiencies of Lofland et al combined with Lopatinsky et al. The Wang reference discloses a heat sink assembly for a central processing unit of a computer. The heat sink assembly includes a radiator formed by a plurality of alternating square plates 30 (fins) and spacers 20, each having a central opening to define a cavity within the radiator. A fan 40 is received within the cavity and provides an air flow wherein cool air is drawn into the heat sink assembly through the vents 70 in the spacers 20 and square plates 30, the air gaps between the fins being shown in Fig. 4. The air exits from the assembly via the central passage 80 into which the fan is disposed, column 3, lines 42 – 47. Thus, this reference teaches away from the air flow of the invention of the subject Patent Application wherein ambient air is drawn longitudinally into the cavity and transversely discharged radially through the air outlet gaps to contact the fins, as now claimed. Further, the reference fails to disclose or suggest a structure wherein an air inlet is located at each of opposing longitudinal ends of the radiator cavity, as now claimed.

As the Wang reference fails to disclose or suggest the combination of

elements which form the invention of the subject Patent Application, and in fact teaches away from such a combination, it cannot, either alone or in combination with Lofland et al. and Lopatinsky et al., make obvious the invention of the subject Patent Application, as now claimed.

For all the foregoing reasons, it is now believed that the subject Patent Application has been placed in condition for allowance, and such action is respectfully requested.

Respectfully submitted,
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